Carpet Cushion Council Remarks on Bonded Carpet Cushion [6/13/06 EAC]

The purpose of this report is (1) to bring you up to date on the results of tests on the PentaBDE content new bonded completed since the 3/15/06 report **[see EAC Meeting #1 Notes, Attachment 3],** (2) to augment previous comments on the end-of-life options for take-up cushion foam in light of the latest test results, (3) to provide background on the unavoidable variability of the PentaBDE content of take-up cushion foam, and in new bonded cushion made from it, and the affect of these variables on the ability of producers to assure compliance with a particular PBDE limit), (4) to advise you regarding tests currently underway on workers handling take-up cushion foam during their employment, and (5) to quantify the amount of PentaBDE that would be being returned to Washington annually in the form of new bonded (and a comparison of that with what would be permitted under a 0.1% limit).

PentaBDE Content of Current Production Bonded Foam Carpet Cushion. Based upon tests conducted on behalf of the Carpet Cushion Council on samples of new cushion manufactured in late 2005, the mean PentaBDE-content of current production new bonded carpet cushion is 0.106%, by weight.

PentaBDE Content of Recyclables/Recycled Products Proposed to be Exempted. A mean PentaBDE-content of 0.313% by weight can be expected to characterize the take-up foam cushion scrap for the next five years, that is until bonded manufactured without any PentaBDE in the post-industrial scrap component (beginning in 2005) begins to be a part of the product being taken up from floors as carpet is replaced. It is this material that an exemption would permit to continue to be recycled. The mean PentaBDE content of the new bonded product made from this scrap is 0.106%, by weight. Beginning in about 2011, at which point the post-consumer scrap then being collected for recycling will consist, in part, of post-2005 bonded cushion production, the PentaBDE-content of new bonded produced with such scrap should begin a decline from the 0.106% by weight level, to a level below 0.1%, with few exceptions.

The End-of-Life Public Policy Options. Based upon the information now available, (a) foam relegated to the landfill will have a mean PentaBDE content of 0.313% while the same foam, when recycled into new bonded, will have a resulting mean PentaBDE content of 0.106%; (b) reducing the amount of take-up scrap that could be used in new bonded to the extent required to bring the PentaBDE-content of new bonded below 0.1% by weight (the limit enacted by several states) would, on a national basis, relegate an additional 45 - 60 million pounds of post-consumer foam cushion to landfills annually; (c) a PentaBDE ban with no tolerance would, on a national basis, relegate an additional 300 to 400 million pounds of post-consumer foam cushion to landfills annually. As a matter of public policy, this choice frames the options for dealing with post-consumer foam cushion scrap.

The Imperative of Recognizing that the PentaBDE Content of Bonded Carpet Cushion is Necessarily Variable.

From the late 1960s-early 1970s until late-2004 early-2005, pentaBDE was used as a BFR in foam where customer specifications required the foam to comply with flammability standards which applied to some furniture, mattresses and automotive foam. The amount of pentaBDE used varied by the specification. For example, compliance with MVSS 302 (automotive) required use of less pentaBDE than compliance with Cal. Tech. Bull. No. 117 (upholstered furniture). Importantly, most foam produced during this period did not contain any pentaBDE. The post-industrial scrap foam from all of these manufacturing operations became the raw material from which bonded carpet cushion was made.

There is no single description that would apply to all recycling operations, but the following is thought to be typical. Post-consumer (take-up) foam cushion scrap is collected either by direct drop-off by carpet installers or pro-active pick-up from carpet distribution points (carpet retailers, work rooms, etc.) that collect the take-up from jobs via carpet installers. The take-up foam scrap is checked for such things as tack strip, blades, metal strips, carpet, or other unwanted materials, a process that requires unrolling each piece. Typically, the take-up scrap cushion is then sorted by density/type, e.g., rebond cushion is separated from prime foam cushion scrap, etc., before it is baled.

Take-up scrap foam is received by the manufacturer of bonded cushion in the form of compressed bales weighing between 400 and 1500 pounds. The average bale of scrap foam weighs between 800-900 pounds and is made up of post-consumer scrap and post-industrial scrap (less than 5%), both types being collected from the new installation. The post-consumer scrap is comprised of pieces that range in size (from 5-15 square yards or 45 -75 square feet) and in thickness. It has been estimated that the average bale consists of from 70 -110 different units of post-consumer foam cushion, which could have come from as many as 110 different sources. The penta content of take-up scrap is necessarily variable from bale to bale, log to log, roll to roll, shipment to shipment, room to room....., but within a narrow range. The actual penta content of any delivery of take-up foam scrap to a bonder is unknown.

Bonded cushion is comprised of a mixture of post-industrial and post-consumer scrap, with the percentage of post-consumer scrap (the only source of pentaBDE in new bonded cushion) used tending to increase as the density of the bonded cushion increases. During the manufacture of bonded cushion, the foam scrap (post-industrial and post-consumer) is ground into an irregularly shaped “crumb”, which ranges in size from 1/4" to 3/4", with take-up grind tending to be smaller (1/4" to “3/8") than the average.

There are two types of bonded plants, known as either extruder plants or log and peel plants. These plants produce, respectively, **buns** that range in weight from **3600-5700** pounds or **logs** that range in weight from **500-1600** pounds. A substantial operation can mold 250-275 logs per day and extrude 100 buns per day. The typical bonded plant is operating 16-24 hours per day, the higher number in peak periods, 5

days a week.

Depending upon the facility, a bonder might have an inventory of anywhere from 50,000 and 1.5 million pounds of post-consumer foam scrap. Inventory levels tend to be dictated by business conditions. Post-consumer scrap foam is typically converted into new bonded and shipped within 5 -14 days of its receipt by the bonder.

Testing of bonded cushion for its penta-content is a process that could take several weeks from the time test samples are collected, making it impractical to test the post-consumer scrap or the new bonded production for its penta-content prior to shipment of the finished product. As a consequence, to gage the penta-content of the finished product, producers of bonded are obliged to blend post-industrial and post-consumer scrap in the context of what is known about the penta content, on average, of post-consumer scrap being collected at the time.

While the penta content of a given quantity of bonded cushion product manufactured can be expected to vary within a log or bun, from one log or bun to the next, from roll to roll, and within a roll, based upon tests conducted to date the finished bonded product (produced in accordance with general industry practice) can be expected to contain, on average, between 0.106% pentaBDE by weight.

The actual penta content of any delivery of take-up foam scrap to a bonder is unknown. Under the circumstances, any regulatory regime that would not take these factors into account would seem inappropriate.

Testing of Workers at Recycling Facilities. In late 2005, researchers from LRC at Duke University initiated a study entitled "PBDE and OH-BDE Levels in Serum from Individuals Working in a Polyurethane Foam Recycling Plant". At this juncture, the researchers have preliminary data on serum PBDE levels collected from five employees of the factory, and their spouses. Serum samples from spouses were analyzed as a reference group. The preliminary data suggest no significant difference between the workers and their spouses. The test data from this study is expected to be available by mid-2006 and the study, once completed, is expected to appear in peer reviewed publications.

This study is currently being enlarged to include workers at bonded cushion manufacturing plants and carpet installers.

Washington-Specific Information

Currently, sales of new bonded cushion in Washington are 32.6 million pounds a year. A PentaBDE limit of 0.1% (such as in California and Oregon) would permit a total of 32, 668 pounds of PentaBDE in this quantity of bonded cushion. Based upon Carpet Cushion Council data on the PentaBDE content of new bonded cushion, produced in accordance with current industry practice, the bonded cushion that would be installed in Washington each year for the next five years under the requested exemption or

exception would be 27,702 pounds. Twenty percent of new bonded cushion is manufactured without any take-up scrap foam (or pentaBDE).

Carpet Cushion Council Data Bases

The Carpet Cushion Council has established a data base regarding the PentaBDE content of take-up scrap cushion foam and the PentaBDE content of bonded cushion produced since PentaBDE ceased to be used in furniture, mattress and automotive foams. This data base will be systematically updated. Under the terms of the waiver granted for bonded by the New York Department of Environmental Conservation, the Council will report on its monitoring and testing of new bonded in January of each year.

For the Carpet Cushion Council by Richard Gimer [Washington Ecology EAC 6/13/06]